

REMARKS**In the Claims**

1. Claims 1-28 and 30-38 are pending in the Application.
2. Applicants would like to express their appreciation for the allowance of claims 1-7, 24, and 27.
3. Claim 14 has been first amended to correct a missing semi-colon. In addition, claim 14 has been amended to more specifically claim the diameter of the insert. Support for this amendment may be found in the Specification at 18:27-19:10. Finally, claim 14 has been amended to more specifically claim the use of an insert absent other elements which do not materially affect the basic and novel characteristics of the device. Support for this amendment may be found in the Specification at 18:27-19:10 and Fig. 9. Applicants believe no new matter has been added by these amendments and entry by the Examiner is respectfully requested.
4. Claim 19 has been amended to an independent claim to include the limitation of the previously-presented claim 14. Applicants believe no new matter has been added by this amendments and entry by the Examiner is respectfully requested.
5. Claims 8-23, 25-26, and 28-34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 6,130,399 to Lu *et al.* ("Lu") and in further view of admitted prior art of the Applicants. As described in Lu, the electrode is a plasma arc torch used for cutting and marking metallic materials. The instant invention, as claimed in the aforementioned claims, is to a "resistance spot welding electrode". Respectfully, Lu does not disclose "a composite resistance spot welding electrode" as asserted by the Examiner. Specifically, the spot welding electrode of the instant invention utilizes electrical resistance through the workpiece to generate sufficient heat to melt the workpiece material and create a nugget. The operation of a plasma arc torch is based upon a high electrical charge creating a

plasma arc "between the electrode (cathode) and the nozzle (anode)." Lu at 1:25-25. Thus, the citation of Lu is inapposite.

6. In *In re Deminski*, 796 F.2d 436, 230 USPQ2d 313 (Fed. Cir. 1986), the Federal Circuit adopted a two-step test for determining whether particular references are within the appropriate scope of the art. First, it must be determined whether the reference is "within the field of the inventor's endeavor". Second, assuming the reference is outside that field, it must be determined whether the reference is "reasonably pertinent to the particular problem with which the inventor was involved". As pertains to the instant invention, Lu is directed specifically to cutting and marking metallic materials. Lu at 1:12-13. In sharp contrast, the instant invention "relates to electrodes for use in resistance spot welding", that is, the joining of two or more workpieces. Specification at 1:4. An inventor involved with resistance spot welding would not reasonably be expected to address the art relating to plasma arc torches. As pertains to the second step, as the Federal Circuit has explained, "[a] person having ordinary skill in the art would not reasonably have expected to solve the problem of dead volume in tanks for storing refined petroleum by considering a reference dealing with plugging underground formation anomalies." *In re Clay*, 966 F.2d 656, 659-60, 23 USPQ2d 1058, 1061 (Fed. Cir. 1992). Put in the context of the instant invention, a person having ordinary skill in the art of resistance spot welding would not reasonably have expected to solve the problem of welding aluminum and similar metals with satisfactory nuggets, with lower energy requirements, with longer useful electrode life by considering a reference dealing with "the conductive flow of ionized gas from the electrode to the workpiece". See, also, *Heidelberger Druckmaschinen AG v. Hantscho Commercial Prod., Inc.*, 21 F.3d 1068, 30 USPQ2d 1377 (Fed. Cir. 1994). Furthermore, Lu does not teach or even suggest the result and benefit of, in a spot welding electrode, conducting electricity to the workpiece efficiently, effectively transmitting the necessary pressure to the workpiece, and rapidly transferring heat away from the interface between the electrode and the workpiece. Accordingly, Applicants submit that claims 8-23, 25-26, and 28-34 distinguishably over the cited art and withdrawal of this rejection by the Examiner is respectfully requested.

7. As to claim 8, the Examiner states that "Lu *et al.* fail to teach, wherein the sleeve has a thickness in the radial direction of about 10-30% of the outside radius of the sleeve". Respectfully, Applicants direct the Examiner to amended claim 8 as shown in Applicants' Amendment and Response dated June 20, 2005, wherein: "the sleeve has a thickness in the radial direction of about 10-25 percent of the outside radius of the sleeve." In addition, as further described and attested to in the Rule 132 Affidavit of Dr. Pingsha Dong submitted with the aforementioned Amendment and Response, the presence of a thick sleeve inhibits the formation of a proper nugget. As described and shown in the Rule 132 Affidavit, it has been surprisingly and unexpectedly found that using a sleeve too thick in the inward direction causes the current to be excessively concentrated and causes an overheating situation. Subsequently reducing the current causes the nugget size to become too small. In addition, a thicker sleeve becomes a larger obstruction for the current to avoid. This new and unexpected result is "different in kind and not merely in degree from . . . the prior art". *Application of Aller*, 220 F.2d 454, 456 (C.C.P.A. 1955). Finally, as also discussed in the Rule 132 Affidavit, prototype testing of electrodes manufactured according to the present invention compared with "standard" electrodes has shown a reduction in current of about 30 percent with an increase in cycle time of about 25 percent. This resulted in a favorable reduction in energy (I^2t) of about 37 percent. Excellent nuggets were produced. Claim 8 and its dependent claims thus distinguish patentably over Lu in view of the admitted prior art and withdrawal of the stated rejection by the Examiner is respectfully requested.

8. As to claim 14, the diameter of the insert in Applicants' admitted prior art is 18 percent, while the diameter of the insert in amended claim 14 is between 25 and 50 percent.¹ In addition, Applicants' admitted prior art also includes a sleeve, an element not present in claim 14. Claim 14 and its dependent claims thus distinguish patentably over Lu in view of the admitted prior art and withdrawal of the stated rejection by the Examiner is respectfully requested.

¹ Applicants respectfully direct the Examiner to their Amendment and Response dated June 20, 2005 in which claim 14 was amended to limit the insert dimensions as noted.

9. As to claim 19, the thickness of the sleeve in the radial direction of Applicants' admitted prior art is 29 percent of the outside radius of the sleeve, while the thickness of the sleeve in claim 19, as previously amended, is 10-25 percent of the outside radius of the sleeve. Claim 19 and its dependent claims thus distinguish patentably over Lu in view of the admitted prior art and withdrawal of the stated rejection by the Examiner is respectfully requested.

10. Claims 12, 13, 17, 18, 22, and 23 stand rejected under 35 U.S.C. § 103(a) in view of the admitted prior art of the Applicants. The Examiner states that the admitted prior art of the Applicants "is capable of having the electrodes compress between 700-2000 pounds-force, 60-Hz current of about 20-30 KA for 10 cycles, a nugget to be formed with a thickness of between 0.3-3.4 mm and a diameter between 2-6mm." As described below, Applicants respectfully contend there is nothing in Applicants' admitted prior art that teaches such a capability.

11. As to claims 12 and 13, both depend, either directly or indirectly, from claim 8. The electrode of claim 8 first comprises a co-axial annular sleeve. The prior art electrode shown in Fig. 1 and described in the accompanying text has no sleeve. Second, the sleeve of the electrode of claim 8 has "a thickness in the radial direction of about 10-25 percent of the outside radius of the sleeve." The prior art electrode shown in Fig. 2 and described in the accompanying text has a sleeve having a thickness in the radial direction of 29 percent.². In addition, the electrode of Fig. 2, as shown and described, produces no nugget at all under the stated conditions. Specification at 14:9-10 and Fig. 2c. Finally, claims 12 and 13, depending from arguably allowable claim 8 as discussed below, are allowable. Claims 12 and 13 thus distinguish patentably over the admitted prior art and withdrawal of the stated rejection by the Examiner is respectfully requested.

17. As to claims 17 and 18, they both depend, either directly or indirectly, from claim 14. The electrode of claim 14 first comprises an insert. The prior art shown in Fig. 1 and described in the accompanying text has no insert. Second, the prior art electrode shown in Fig. 2

² Applicants respectfully direct the Examiner to their Amendment and Response dated June 20, 2005 in which a Declaration of Dr. Pingsha Dong according to 37 C.F.R. § 1.132 explains the problems and shortcomings of the cited prior art electrode.

and described in the accompanying text produces no nugget at all under the stated conditions. Specification at 14:9-10 and Fig. 2c. Finally, claim 17 and 18, depending from arguably allowable claim 14 as discussed below, are allowable. Claims 17 and 18 thus distinguish patentably over the admitted prior art and withdrawal of the stated rejection by the Examiner is respectfully requested.

18. As to claims 22 and 23, they both, either directly or indirectly, from claim 19. The electrode of claim 19 first comprises an insert and a co-axial annular outer sleeve. The prior art shown in Fig. 1 and described in the accompanying text has neither an insert nor a sleeve. Second, the prior art electrode shown in Fig. 2 and described in the accompanying text produces no nugget at all under the stated conditions. Specification at 14:9-10 and Fig. 2c. Finally, claims 22 and 23, depending from arguably allowable claim 19 as discussed above, are allowable. Claims 22 and 23 thus distinguish patentably over the admitted prior art and withdrawal of the stated rejection by the Examiner is respectfully requested.

19. As to claims 25 and 26, Lu fails to teach a neck ring. In addition, Applicants respectfully renew their traverse of the rejection of claims 25 and 26 as outlined in Applicants' previous Amendment and Response dated June 20, 2005. Claims 25 and 26 thus distinguish patentably over Lu and the admitted prior art and withdrawal of the stated rejection by the Examiner is respectfully requested.

20. As to claim 28, Lu and Applicants' admitted prior art fail to teach the sleeve as claimed therein. In Applicants' admitted prior art, there is no annular end surface which cooperates with an inner portion of the electrode tip to form a continuous face. In Lu, there is no outer sleeve as that element is included in claim 28. Beyond that, Applicants renew their traverse that Lu is non-analogous art. Finally, Applicants respectfully renew their traverse of the rejection of claim 28 as outlined in Applicants' previous Amendment and Response. Claim 28 thus distinguishes patentably over Lu and the admitted prior art and withdrawal of the stated rejection by the Examiner is respectfully requested.

21. Claims 35-38, respectfully, have not been addressed by the Examiner. Review and consideration by the Examiner, culminating in allowance, is requested.

22. Claims 10, 16, and 21 stand rejected over Lu in view of Applicants' admitted prior art. Lu teaches and requires "a high thermionic emissivity material" or "a high thermal conductivity material". To the contrary, the stainless steel of these claims is not such a material. Claims 10, 16, and 21 thus distinguishes patentably over Lu and the admitted prior art and withdrawal of the stated rejection by the Examiner is respectfully requested.

23. As to claims 9, 11, 15, 20, and 30-38, each now depends from an arguably base claim. These claims thus distinguish patentably over Lu and Applicants' admitted prior art and withdrawal of the stated rejection by the Examiner is respectfully requested.

Closure

1. Previously, fees were paid for a total of 37 claims and 7 independent claims. As submitted herewith, a total of 37 claims and 8 independent claims are remaining with the Application. Pursuant to 37 C.F.R. §§ 1.16(h), additional fees in the amount of \$100.00 are due.

2. As this Amendment and Response is being submitted before the Shortened Statutory Period set to expire December 7, 2005, Applicants believe no extension fees are due.

3. Applicants enclose herewith a credit card authorization form PTO-2038 for \$100.00 for the abovementioned fees. Please charge any additional fees, or credit any overpayments in connection with this Response to Applicants' undersigned counsel's Deposit Account 021266. A duplicate copy of this authorization is also enclosed.

4. Applicants' undersigned attorney has made a good faith effort to meet the concerns expressed by the Examiner in the Office Action. If the Examiner still has some issues with the Application, and has any suggestions as to how to address the, the Examiner is invited

to call the Applicants' undersigned attorney at the phone number given below, so that those issues may be resolved.

5. Accordingly, Applicants submit that this Application is now in condition for further favorable consideration, culminating in allowance. Such action is respectfully requested.

Respectfully submitted,



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